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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/645,903 | 08/25/2000 | Li Li | 3361.2US (97-663.2) | 6825 |
| 24247 | 7590 | 12/28/2004 | EXAMINER | |
| TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110 | | | GUERRERO, MARIA F | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2822 | |

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/645,903

Applicant(s)

LI, LI

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8 and 9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to the Amendment and the Request for continued examination filed December 10, 2004.

Status of Claims

2. Claim 7 is canceled. Claims 1-6 and 8-9 are pending.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 10, 2004 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jin et al. (U.S. 5,883,001) in view of Wilson et al. (U.S. 4,943,539).

Jin et al. teaches a contact opening in a dielectric layer extending from an upper surface of the dielectric layer to a substantially damage free metal-containing

conductive pad having substantially parallel (residue-free) sidewalls (Fig. 8, col. 7, lines 29-31, 45-49). Jin et al. teaches a contact opening in a dielectric layer and a barrier layer, the semiconductor substrate having a substantially damage free metal-containing conductive pad under the dielectric layer and the barrier layer. Jin et al. also shows the residues being removed from the contact opening (residues free) (Fig. 8, col. 2, lines 55-60, col. 7, lines 45-49). In addition, Jin et al. teaches employing a fluorine-containing compound (col. 7, lines 49-50).

Regarding the limitations "the metal-containing conductive pad substantially free of charging damage"; Jin et al. teaches that no oxide residue remains on the pads. Jin et al. also teaches limiting the dry etch time to avoid the charging damage (Fig. 8, col. 2, lines 55-65, col. 7, lines 45-62, col. 8, lines 25-30, col. 10, lines 5-12). Therefore, the metal-containing conductive pad taught by Jin et al. is substantially free of charging damage.

Regarding the limitations "a metal polymer residue-free and oxide polymer residue free contact"; Jin et al. teaches the contact opening being residues free (Fig. 8, col. 2, lines 55-60, col. 7, lines 45-49). Therefore, there is not metal polymer residue or oxide polymer residue in the contact opening.

Jin et al. does not specifically show removing the residues by applying nitric acid and phosphoric acid. However, Wilson et al. shows that the use of nitric acid and phosphoric acid for the removing of residues is well known in the art (col. 4, lines 35-38).

Furthermore, product-by-process claims are limited and defined by the process; determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process. In re Hirao and Sato et al., 190 USPQ 15 at 17 (CCPA 1976 (footnote 3)). See also In re Brown and Saffer, 173 USPQ 685 (CCPA 1972); In re Luck and Gainer, 177 USPQ 523 (CCPA 1973); In re Fessmann, 180 USPQ 324 (CCPA 1974); In re Marosi et al., 218 USPQ 289 (Fed. Cir. 1983); In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to recognize that the structure taught by Jin et al. would correspond with the structure claimed because there is not evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-6 and 8-9 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2 of U.S. Patent No. 6,747,359. Although the conflicting claims are not identical, they are not patentably distinct from each other because '359 described the residue-free opening having substantially parallel sidewalls and extending from the upper surface of the dielectric layer through the metal barrier layer to the metal-containing pad.

Response to Arguments

5. Applicant's arguments filed December 10, 2004 have been fully considered but they are not persuasive. Claims 1-6 and 8-9 stand rejected. A new rejection has been applied in view of a new reference (Li (U.S. 6,747,359)).

Applicant argued that the combination of Jin et al. and Wilson et al. fails to teach an opening in a dielectric layer having substantially parallel sidewalls. However, Jin et al. shows a contact opening in a dielectric layer extending from an upper surface of the dielectric layer to a substantially damage free metal-containing conductive pad having substantially parallel sidewalls (Fig. 8, col. 7, lines 29-31, 45-62, col. 8, lines 25-30, col. 10, lines 5-12).

Applicant argued that the combination of Jin et al. and Wilson et al. fails to teach all claim limitations. However, the patentability of a product does not depend on its

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method of production. If the product in the product-by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process. In re Hirao and Sato et al., 190 USPQ 15 at 17 (CCPA 1976 (footnote 3)). See also In re Brown and Saffer, 173 USPQ 685 (CCPA 1972); In re Luck and Gainer, 177 USPQ 523 (CCPA 1973); In re Fessmann, 180 USPQ 324 (CCPA 1974); In re Marosi et al., 218 USPQ 289 (Fed. Cir. 1983); In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Applicant argued that Jin fails to teach or suggest the substantially damage free metal containing conductive pad because Jin acknowledges the main etch and overetch may induce charging damage. However, Jin et al. also teaches limiting the dry etch time to avoid the charging damage and producing excellent reliability (Fig. 8, col. 2, lines 55-65, col. 7, lines 45-62, col. 8, lines 25-30, col. 10, lines 5-12). Therefore, the metal-containing conductive pad taught by Jin et al. is substantially free of charging damage.

Furthermore, a person of ordinary skill in the art at would recognize that the structure taught by Jin et al. would correspond with the structure claimed because there is not evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983).

In addition, during patent examination, the pending claims must be "given *their< broadest reasonable interpretation consistent with the specification." > In re Hyatt, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). While the claims of issued patents are interpreted in light of the specification, prosecution history, prior art and

other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allow. > In re American Academy of Science Tech Center, F.3d , 2004 WL 1067528 (Fed. Cir. May 13, 2004)(The USPTO uses a different standard for construing claims than that used by district courts; during examination the USPTO must give claims their broadest reasonable interpretation.) < This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) >; Chef America, Inc. v. Lamb-Weston, Inc., 358 F.3d 1371, 1372, 69 USPQ2d 1857 (Fed. Cir. 2004).

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

December 22, 2004

Maria F. Guerrero
MARIA F. GUERRERO
PRIMARY EXAMINER